Pollution Prevention: Toxic Chemical Uses, Nonproduct Output, and Releases

Background

Industrial and other facilities in New Jersey use toxic substances in production processes and while performing services. Laws requiring public disclosure of chemical uses and releases by industry are an important factor in prompting them to reduce emissions and become more efficient in the use of toxic substances. New Jersey's Right-to-Know law requires thousands of facilities to report quantities of certain toxic chemicals on site, and also requires throughput reporting by a subset of facilities that are required to be reported to the EPA according to the Toxic Release Inventory (TRI) rules.[1] Throughput refers to the quantities of substances actually moving through a facility; it includes quantities brought on site, consumed during production processes, shipped off site as or in product, and quantities that emerge from a production process but are not intended products. The latter, called nonproduct output (NPO) can be further subdivided depending on the fate of the substance: it can be released to the environment in some form, or it can be recycled, treated, or transferred to a disposal or management facility. New Jersey is one of only two states in the nation that require throughput reporting. New Jersey's throughput reporting program is administered by the DEP's Pollution Prevention and Right to Know program.[2]

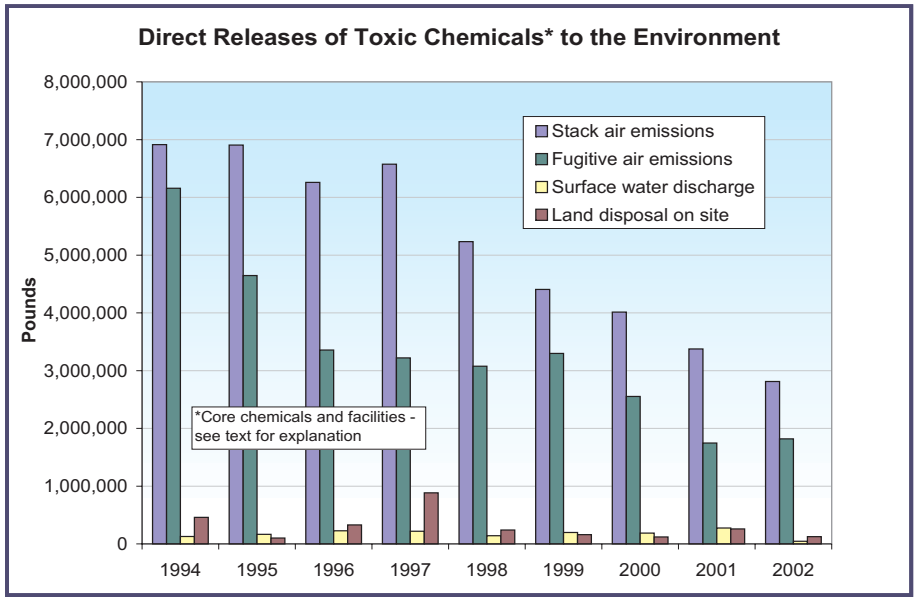
The New Jersey Pollution Prevention Act (P2 Act) mandates pollution prevention planning for regulated industries. Implementation of these plans, however, is voluntary. The planning program requires hundreds of New Jersey manufacturing companies to develop materials accounting information. To develop this information, they first determine the amount of chemical that entered the facility and then subtract the amount of chemical that left it as either product or waste. The amount that is not contained in the product or consumed in the reaction is waste (pollution) that may be reduced by implementing pollution prevention initiatives. Studies of the planning program have shown not only significant benefits to the environment, but economic benefits to the industries as well.[3]

While toxic substances often play a vital role in the operations of a facility, they also can pose potential risks to workers, the general public and the environment if they are not properly managed. Increasing efficiency and reducing NPO of these substances has become a goal of many businesses and manufacturers in New Jersey. Innovative technologies and pollution prevention initiatives exist for many businesses seeking to reduce the amount of toxic materials they generate, use and ultimately need to discard.

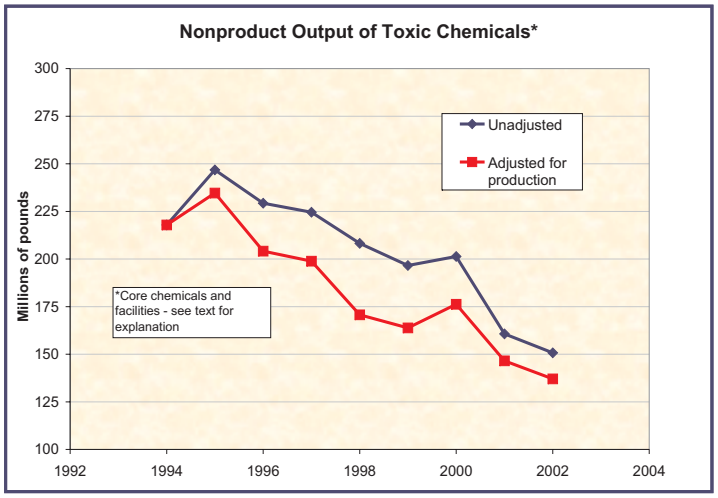
Pollution prevention can lead to more efficient production processes and safer products. Further, by reducing quantities of waste that require treatment and control, manufacturers can avoid costly disposal of hazardous wastes and simplify the process of complying with regulations and reduce pollution.

Trends

Because both the group of chemicals required to be reported and types of facilities required to report these chemicals have changed from 1987 to 1994, the DEP tracks a subset of facilities and chemicals. This subset is comprised of "core chemicals" consistently reported from 1994-2001 and "core SIC codes" 20-39[4] excluding those facilities that claim trade secrets. The trends show a consistent decline in emissions. (See "Releases of Toxic Chemicals to the Environment" and "Nonproduct Output of Toxic Chemicals" below)



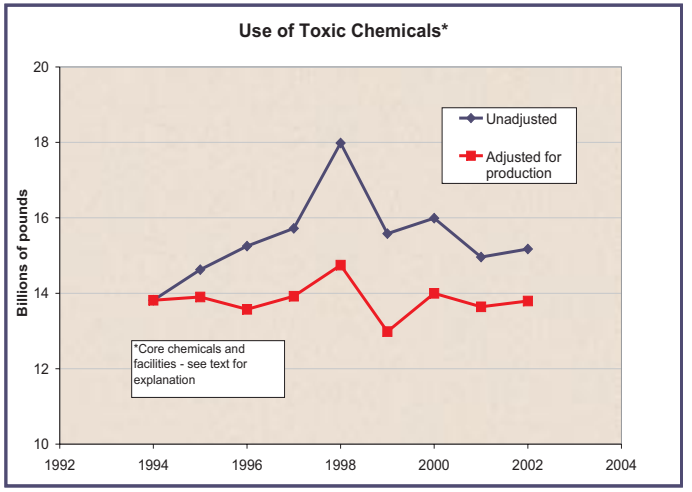
It should be noted that trends in toxic substance quantities as tracked by looking at the group of core chemicals are strongly influenced by chemicals that are used by refineries. New Jersey has six refineries that process relatively huge amounts of materials. A number of chemicals on the TRI list are constituents of petroleum, and so are reported by the refineries. Other groups of chemicals and facilities can be tracked. Trends in a number of different groups of chemicals and facilities have been performed by the DEP, and are described in detail in the document, Industrial Pollution Prevention in New Jersey: A Trends Analysis of Materials Accounting Data from 1994 to 2001. (See references for more details).



Trends in use of the core chemicals do not show a decline. See the chart "Use of Toxic Chemicals" below. Other groups of chemicals also typically do not show a decline in use.

The lack of a declining trend in use is of some concern because a significant portion of the chemicals used ends up in products, some of which are sold to consumers. For example, in 2001, approximately 87 percent of the chemicals used were shipped off-site as, or in, products, 12 percent were consumed (chemically changed in production processes) and only 1 percent became nonproduct output. Of that 1 percent, only 6 percent was directly released to the environment at the site; the remaining 94 percent was transferred off-site for management or disposal or managed on-site.[5]

Chemicals that are persistent, bioaccumulative and toxic (PBTs) are of particular concern not only because they are toxic, but also because they remain in the environment for long periods of time and can build up or accumulate in body tissue. EPA has established a list of 18 chemicals and compounds that are considered PBTs, and which must be reported on the TRI, and has lowered the threshold for reporting these chemicals. In New Jersey, the throughput of these substances must also be reported on the RPPR. Due to these recent changes in reporting requirements and the short time period that most of the PBT chemicals have been reported, it is difficult to track a "core" group of facilities for PBT chemicals. However, it appears that most of the PBTs are shipped as, or in, product. A closer look at the data shows that the majority of PBTs shipped in product are lead and polycylic aromatic compounds (PACs). Lead is shipped, for example, in product by several battery manufacturers, metal recyclers and cable and electronics board manufacturers. PACs are shipped as a chemical component in petroleum products.[6]



Outlook and Implications

The fate of many toxic substances in consumer products is not well understood. Many of these chemicals may eventually be released to the environment, risking harmful exposure to humans and wildlife.

A recent report has shown that more than 40 times the amount of chemicals

directly released to the environment by industrial facilities is likely to be shipped off site as, or in, products that are likely to end up in consumers' homes. The report also found that significant portion of those chemicals served no particular purpose in the product, and hence should be amenable to removal through product reformulation. Another finding of the report was that, among the 10 chemicals most likely to be found in products in the home, only one is on the Centers for Disease Control's list of chemicals regularly examined in national biomonitoring, so the actual extent of exposure from the other chemicals commonly found in these products is unknown.[7]

It is hoped that continued pollution prevention efforts by New Jersey facilities will lead to not only further decreases in direct releases and nonproduct output, but also to reductions in use of toxic substances, especially those substances that are shipped off site as, or in, product.

The statewide policy goal of the P2 Act was a 50 percent reduction in NPO between 1987 and 1994, and a significant reduction in use of toxic substances. Earlier analyses of data by the NJDEP have shown that the NPO reduction goal has been achieved. Continued progress in pollution prevention is desired.

More Information

Contact the NJDEP Office of Pollution Prevention and Right to Know at http://www.nj.gov/dep/opppc. Further information on TRI substances can also be obtained from the USEPA at http://www.epa.gov/tri/tridata/tri02/index.htm.

References

[1] See http://www.epa.gov/tri/.

[2] See http://www.nj.gov/dep/opppc/ .

[3] Natan, Thomas, Catherine Miller, Bonnie Scarborough, and Warren Muir, 1996, Evaluation of the Effectiveness of Pollution Prevention Planning in NJ, report prepared for NJDEP Office of Pollution Prevention by Hampshire Research Associates, Alexandria, VA (see http://www.nj.gov/dep/opppc/reports/hamp1.htm

[4] "SIC" stands for standard industrial classification. With this system, which is currently undergoing revision, facilities are classified according to their type of business or product. SIC codes 20 through 39 include the major manufacturing facilities such as chemical plants, metal producers and fabricators, petroleum refineries and others.

[5] NJ Department of Environmental Protection (NJDEP), 2004, Industrial Pollution Prevention in New Jersey: A Trends Analysis of Materials Accounting Data from 1994 to 2001, available at http://www.nj.gov/dep/opppc/reports.html.

[6] NJDEP, 2004, page xiv.

[7] National Environmental Trust, 2004, Cabinet Confidential: Toxic products in the home, National Environmental Trust, 1200 Eighteenth St., NW, Washington, DC, www.net.org.